



MRC-135A

Single Battery Solar Charger



Operation Manual

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Revision History

Version	Description of Change	Effective Date
REV: A	Previous revision	MAY 00 2006
REV: B	This manual has been updated to reflect the new template design.	MAY 01 2008

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1 ABOUT THIS MANUAL

This manual has been prepared by McDowell Research, an Ultralife Company, for the purpose of providing the user information necessary to understand and maintain the MRC-135A Single Battery Solar Charger.

1.1 Symbols Used

The symbols shown in this section appear throughout this manual, the first one shown being the *NOTE* symbol, below, which is self-explanatory.



NOTE: *Note statements contain important information that may affect how you use this product.*

The other symbols represent *important safety advice*, and they appear throughout this manual in the form of *WARNINGS* and *CAUTIONS* against possible hazards to people or equipment, respectively. These safety *WARNINGS* and *CAUTIONS* must be followed at all times. They are flagged by use of a triangular alert icon shown just to the left of the cautionary advice given, as shown below:



WARNING: *Warning statements mean danger. They identify practices, procedures or conditions such as high voltage that could result in injury or loss of life and which, therefore, require extreme care before proceeding.*



CAUTION: *Caution statements denote a hazard. They identify practices, procedures or conditions that could result in damage to or destruction of this product or other equipment or property.*

McDowell Research assumes no liability for the customer's failure to comply with these *WARNINGS* and *CAUTIONS*.

1.2 General Safety Instructions



WARNING: Prior to using the MRC-135A, please read the safety and caution instructions located in this section to prevent the mischarge or catastrophic destruction of a battery.

While inherently safe, misuse of the MRC-135A may result in damage to the battery and/or the MRC-135A battery charger. Specifically:

- Before using the MRC-135A battery charger, read all instructions and cautionary markings on (1) the battery charger, (2) battery, (3) product using the battery.
- To reduce the risk of injury, charge only batteries this charger is designed to charge. Attempting to charge other types of batteries may cause personal injury and/or equipment damage.
- Do not operate the MRC-135A if it has received a sharp blow, been dropped, or otherwise damaged in any way; take it to a qualified repair technician for servicing.
- Do not place the unit in liquid or allow to accrue moisture; this may cause a malfunction of required internal equipment or cause harm to the operator and ancillary equipment.
- Use of an attachment not recommended or sold by the battery charger manufacturer may result in risk of fire, electric shock, or personal injury.
- To reduce risk of damage to electric plug or cord, pull by plug rather than cord when disconnecting charger.
- Make sure cord(s) is located so that it will not be stepped on, tripped over, or otherwise subjected to damage or stress.
- An extension cord should not be used unless absolutely necessary. Use of improper extension cord could result in risk of fire and electric shock.
- Do not operate the charger with damaged cord or plug—replace it immediately.
- Do not disassemble the MRC-135A; take it to a qualified repair technician when service or repair is required.
- Incorrect reassembly may result in a risk of electric shock or fire. To reduce risk of electric shock, unplug charger from its power source before attempting any maintenance or cleaning. Turning off controls will not reduce this risk.
- If there are any questions regarding maintenance or safety-of-use issues pertaining to the MRC-135A, please contact our service department at:

Service Department
McDowell Research, an Ultralife Company
(PHONE) (315) 332-7100 (FAX) (315) 331-7800
(Email) service@mcdowellresearch.com

2 PRODUCT DESCRIPTION

The MRC-135A Single Battery Solar Charger allows worldwide operation from solar panels or a DC power source. The MRC-135A can only be used with a BB-2590 Lithium Ion and a BB-390 NiMH. A DC input from 11 to 36 VDC can be utilized using a PCP-253 power cable.

2.1 Equipment Provided

Each unit is shipped with the following.

Equipment	Quantity
MRC-135A Operational Manual	1
MBC-135A Single Battery Solar Charger	1
MRC135-07-01 Solar Cable	1
PCP-253 DC Power Cable	1

2.2 Physical Description

The MRC-135A dimensions are as follows:

Dimension	Measurement
Length	4.8125 inches
Width	3.1875 inches
Height	2.00 inches
Weight	1.4 lbs

2.3 External Components

The MRC-135A consists of the following external components:

- ◆ One battery connector
- ◆ One input connector
- ◆ Three LED lenses

3 OPERATION

The subsequent sections will list in chronological order how to operate the battery charger safely and efficiently.

3.1 Connections and Start-up for Power Input

For start-up connections, follow the directions below:

1. To charge the battery, first connect the MRC-135A to a battery via the connector on the bottom of the unit.
2. Connect the MRC-135A to a 50 or 60 Watt solar panel using a MRC135-07-01 solar cable.



NOTE: For DC power source, use the PCP-253 DC power cable.

3. Wait 4.5 to 8 hours for the battery to fully charge.

3.2 Controls and Indicators (LEDs)

The MRC-135A has three light emitting diodes (LEDs) located beside the input connector, described in the two following sections.

3.2.1 Input LED

The Input LED indicates the recognition of a power source. When the led is on the MRC-135A is receiving power.

3.2.2 Bat 1 and Bat 2 LEDs

The “Bat 1” LED indicates the status of the first battery section. “Bat 2” indicates the status of the second battery section. There are three status indicators for these LEDs, as follows:

- ◆ When the LED lights are on, the battery is charging.
- ◆ When the indicators are off, the battery is charged.
- ◆ When the LED is blinking, the battery has a fault.

4 MAINTENANCE

Maintenance for the MRC-135A is described in the following sections.

4.1 Serviceable Parts

The MRC-135A has NO user serviceable parts. Units requiring repair should be sent to a qualified service depot for repair, or follow instructions in the maintenance chapter of this manual.

4.2 Cleaning

Cleaning of the MRC-135A is described in the following sections.

4.2.1 Dirt and Dust

All external components to the MRC-135A can be cleaned with a water dampened non-abrasive cloth and allowed to air dry or wipe dry with a clean dry non-abrasive cloth.

4.2.2 Oils and Grease

All external components of the MRC-135A can be cleaned with a mild soap/water solution dampened non-abrasive cloth once the power source has been removed. Rinse with water dampened non-abrasive cloth and allowed to air dry or wipe dry with a clean dry non-abrasive cloth.

4.3 Corrective Maintenance

The MRC-135A has NO user serviceable parts. Units requiring corrective maintenance should be sent to McDowell Research for repair. Contact information is provided in the next chapter.

5 CUSTOMER ASSISTANCE

5.1 Warranty Information

Warranty Statement

4 years for equipment shipped after May 1, 2004.

3 years for equipment shipped prior to May 1, 2004.

McDowell Research warrants to its customers that the products it manufactures and sells will be free from defects in materials and workmanship for a period of four (4) years for equipment shipped after May 1, 2004.

This warranty shall not apply to any defect, failure or damage caused by improper use or inadequate maintenance and care. McDowell shall not be obligated to provide service under this warranty to repair, service, or modify these products.

In order to obtain service under this warranty, customers must return a failed unit to McDowell with a description of the failure, contact information (in case questions arise and to speed up processing of guarantee claims) and finally a return shipping address. McDowell will return any failed unit at McDowell's cost.



NOTE: This warranty does not apply to batteries supplied by McDowell Research. All batteries supplied by McDowell Research are warranted for 90 days from date of shipment.

5.2 Contact/Return Information

Please call (315) 332-7100 to obtain an RMA number prior to returning any failed unit(s) to:

McDowell Research, an Ultralife Company
2000 Technology Parkway
Dock "X"
Newark, New York 14513
Phone: (315) 332-7100
Fax: (315) 331-7800

Online RMA requests can be located and submitted at:
http://www.mcdowellresearch.com/rma_form.php or
service@mcdowellresearch.com

6 SPECIFICATIONS

Table 1: Physical Characteristics

Dimension	Measurement
Width	3.1875 inches
Length	4.8125 inches
Height	2.00 inches
Weight	1.4 lbs.

Table 2: Environmental Characteristics

Dimension	Measurement
Storage Temperature	-50° C to +65° C
Operating Temperature	-30° C to +55° C
Relative Humidity	95%
Storage Altitude	55,000 ft.
Operating Altitude	27,000 ft.

Table 3: Electrical Characteristics

Dimension	Measurement
DC Input Range	2 x 30 Watt solar panels or 1 x 50 Watt solar panel
Charge Rate	1.0 amps per string
Charge Time	4.5 to 8 hours depending on conditions